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International Comparisons of Railway Ton-Mile Revenues 1/

The Ton-Mile Average as a Measure of Rate Levels

The freight revenue per ton-mile for the railway system of a particular country is ascertained by dividing the total railway freight revenue by the number of tons carried one mile.

This revenue per ton-mile is sometimes called earnings or receipts per ton-mile, average charge per ton-mile, and (erroneously) average rate per ton-mile.

The annual average revenue per ton-mile for the railway system is often used as an index of the general level of railway freight rates. The advantage of this statistical average for this purpose was indicated by Mr. C. C. McCain in his report on changes in railway transportation rates, prepared for the U. S. Senate Committee on Finance in 1893. Mr. McCain said that "a statement of the average charges per ton per mile prevailing during successive periods" has "the advantage over all others since no portion of traffic is excluded, but that all business, whether through or local, of relatively great or inconsiderable importance is represented in the final average." 2/ Professor Arthur T. Hadley also remarked that the average revenue per ton-mile, rough as it is, has at least the merit of dealing with traffic actually handled and that the tariff-schedule comparison, plausible as it seems, has the demerit of giving disproportionate weight to traffic which is not actually handled. 3/

It should be noted, however, that the variations in the average revenue per ton-mile from year to year are not merely or necessarily caused by changes in tariff rates. Among the other major factors which affect the ton-mile earnings are: (1) the distribution of freight tonnage between heavy-loading commodities carried at low rates and manufactured goods taking high rates; (2) the proportion of tonnage shipped

1/ Prepared by G. M. Saharov, Associate Economist.

2/ C. C. McCain, "Report of Changes in Railway Transportation Rates on Freight Traffic Throughout the United States, 1852 to 1893", prepared for the Senate Committee on Finance, 52d Congress, 2d Session, Extract from Senate Report No. 1394, Washington, 1893, p. 614.

3/ Henry H. Swain, "Comparative Statistics of Railroad Rates," art. in Quarterly Publications of the American Statistical Association, Boston, September 1898, p. 125 (Remarks by Arthur T. Hadley).

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for short and long hauls; and (3) the distribution of tonnage carried at trainload, carload, and less-than-carload rates respectively.

Due to the dissimilarity of freight service provided by various railways, the freight charges per ton-mile vary within wide limits even if the same rate scales are in effect. According to Mr. Henry Fink's report (published in 1894), the freight charges per ton-mile fluctuate from eight or ten cents on first class freight carried over only a few miles of the road to three and one-half mills per ton-mile on long haul coal and mineral traffic. ^{1/} In this connection it is also interesting to note a statement on the variation in the cost to the railroad per ton-mile, made by Albert Fink, Vice President of the Louisville & Nashville Railroad Company, as long ago as 1874: "... a careful investigation shows that under the ordinary conditions under which transportation service is generally performed the cost per ton-mile in some instances may not exceed one-seventh of a cent and in others will be as high as 73 cents per ton-mile on the same road. The lower cost applies to freight carried in cars that otherwise would return empty; the higher cost to freight in small quantities carried short distances." ^{2/}

It is apparent that any variation in the proportion of tonnage moved at the different rates may decrease or increase the average revenue per ton-mile without regard to whether freight rates were changed during the specified period of time or not. And conversely, a change in railway rates may not be accompanied by the change in the average revenue per ton-mile, or it (a change in railway rates) may result in the disproportionate change in the ton-mile revenue due to the fact that a change in rates also caused a change in the proportion of tonnage moved at the different rates. It is evident that the use of the average revenue per ton-mile to measure the course of freight rates may lead to faulty conclusions unless due consideration is given to other factors affecting the ton-mile revenue average.

In the comparison of the ton-mile revenue, the length of the average haul must not be overlooked as an important factor in judging the railway earnings per unit of freight traffic service since an increase or decrease in the length of the average haul produces a reverse

- ^{1/} Henry Fink, "Analysis and Review of the Opinion and Decision of the Interstate Commerce Commission in the cases of the Freight Bureau of the Cincinnati Chamber of Commerce vs. the Cincinnati, New Orleans and Texas Pacific Railway Company et al ...", New York, 1894, p. 39.
- ^{2/} "Annual Report of the Louisville & Nashville Railroad Company, 1873-74", Louisville, Ky., 1875, p. 46.

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change in the terminal expenses per unit of traffic. Dr. Henry C. Adams, a former statistician to the Interstate Commerce Commission, stated "... it is universally recognized that terminal or dispatch expenses constitute a considerable portion of the aggregate of operating expenses, and that as the length of haul increases, the ratio of this class of expenditures decreases." ^{1/}

Others have frequently called attention to the shortcomings of the average revenue per ton-mile as a statistical measure of rate levels.

But in spite of all these disadvantages, Dr. Henry C. Adams stated that it seems wise in the absence of a better unit of comparison to retain the ton-mile average and to undertake its development so as to obviate the criticisms that may justly be made upon it. ^{2/} Dr. Adams had recommended the separation of railway traffic and earnings on the basis of the kinds of freight carried. ^{3/}

Professor William Z. Ripley also remarked that the revenue per ton-mile (for a particular road) will in many cases be found highly serviceable in the examination of particular rates. He said: "It may properly be used to determine whether a given commodity is contributing its due proportion to the general budget of the carrier. Revenue per ton-mile can, of course, be computed for each particular service; inasmuch as both the income and the volume of that service are matters of independent record." ^{4/}

The ton-mile revenue unit had received the approval of the Institut International de Statistique and by the end of the last century it was adopted in the reports of all important countries with the exception of England. ^{5/} ^{6/}

- ^{1/} Henry C. Adams, Statistician to the Interstate Commerce Commission, "Prussian Railway Tariffs," a report prepared for the (U. S. Senate) Committee on Interstate Commerce, 59th Congress, 1st Session, Senate Document No. 244, Part 2, Appendix IX, Washington, 1906, p. 12.
- ^{2/} Henry H. Swain, "Comparative Statistics of Railroad Rates," art. in Quarterly Publications of the American Statistical Association, Boston, September, 1898, p. 123 (Remarks by Henry C. Adams).
- ^{3/} Ibid., pp. 122-123.
- ^{4/} William Z. Ripley, Professor of Economics in Harvard University, "Railroads, Rates, and Regulation," New York, 1913, p. 425.
- ^{5/} Remarks by Henry C. Adams, op. cit., p. 123.
- ^{6/} "International Railway Statistics," published annually at present by the International Union of Railways, also does not contain the ton-mile revenue data for the British railways as a system.

The preceding comment relates chiefly to comparisons of ton-mile revenues over a period of years for a single railway or for all railways in one country. The average is less useful in comparing within the same country the level of charge of one railway with another, one of which may carry chiefly coal and another chiefly manufactured products. This limitation also applies to regional comparisons in the same country, such as one between the Pocahontas and New England regions. It applies with greater force to international comparisons because, in addition to variations in traffic, there are variations in the nature and extent of the accessorial services customarily included in the rate. Even if all such differences are taken into account, the international comparison of ton-mile earnings would also raise the question of the significance of the showing in view of different policies of taxation, regarding import and export rates, and as to social policies which call for low rates for special purposes.

Comment on Early Attempts at International Comparisons
of Freight Rates

Perhaps the earliest international comparisons of railway freight revenue per ton-mile was that made by Dr. Dionysius Lardner in 1850. Dr. Lardner in his book on railway economy in Europe and America presented a table in which, among other data on railway traffic, he showed the following "average receipts per ton per mile" for the United Kingdom, United States, Belgium, and Germany: ^{1/}

	Year reported (Year ended)	Average receipts per ton per mile (Pence)
United Kingdom	June 30, 1847	1.67 (estimated)
United States (railways in the States of New England and State of New York)	Dec. 31, 1847	1.80
Belgium (state railways only)	Dec. 31, 1847	1.34
Germanic States (principal railways only)	Dec. 31, 1846	2.60

^{1/} Dionysius Lardner, D.C.L. & C., "Railway Economy; a Treatise on the New Art of Transport, Its Management, Prospects, and Relations, ... - with an Exposition of the Practical Results of the Railways in Operation in the United Kingdom, on the Continent, and in America," New York, 1850, pp. 419-420, also pp. 66, 185-186, 343-344, 354, 357, 366, 407-409.

No attempt was made by this author, however, to explain the causes underlying the differences shown.

In later decades the question of the International comparisons of railway freight revenue per ton-mile received attention from various private investigators and government agencies. For instance, certain international ton-mile revenue data for 1883 appeared in a French periodical, "Journal des Economistes", and were re-published in the Mulhall's "Dictionary of Statistics", London, in 1892. In 1894 they were reprinted in the "Eighth Annual Report" of the Interstate Commerce Commission: ^{1/}

	Revenue per ton-mile (Pence)
United Kingdom	1.40 ^{2/}
France	1.10
Germany	.82
Russia	1.20
Austria	1.15
Sweden	1.25
Norway	1.60
Denmark	1.20
Holland	1.44
Belgium	.78
Switzerland	1.65
Roumania	.78

At an early date students of railway economics became aware of the fact that international comparisons of ton-mile revenue in tabular form were misleading unless accompanied by considerable qualification. In 1886 Mr. J. Grierson, General Manager of the Great Western Railway, England, pointed out that "... as a rule, no fair, or even useful, comparison can be made between rates per ton per mile on railways in England, and those charged on railways in continental countries. A multitude of circumstances - original cost of construction, difference in gradients, nature of services performed, speed in transit, limited liability of foreign companies, opportunities for getting full loads, immunity from taxation - must all be taken into account before a just

^{1/} Michael G. Mulhall, Fellow of the Royal Statistical Society, "The Dictionary of Statistics," London, 1892, p. 498; also "Eighth Annual Report" of the Interstate Commerce Commission, Washington, 1894, Appendix E, p. 228.

^{2/} Apparently an estimated figure - author of this study.

comparison can be established." 1/

About the same time Professor Arthur T. Hadley in comparing railway freight revenue per ton-mile for different countries emphasized the intimate relation between "the length of average distance per ton carried" and average receipts per ton-mile. Referring to relatively high average rates per ton-mile in France in the early eighties in comparison with average rates in Germany and the United States, he stated that the failure to lower average rates in France was probably due largely to the failure to develop long distance traffic as other nations have developed it. 2/ In comparing average freight rates in Belgium with average rates in other countries, he explained that freight rates in Belgium "are much lower than anywhere else in Europe. Nominally they are about the same as in the United States. Practically they are lower for almost any given service, because Belgium does not have the enormous long-distance traffic which brings down the average in the United States." 3/

Discussing the difficult problem of comparing American and English freight rates and emphasizing the fact that English railway companies do not furnish and compile railway ton-mileage statistics, Professor Hadley said: "Any attempt at comparison of freight charges would be long, technical, and unsatisfactory. On high-class freight it is altogether impossible, because the English rates for such goods include collection and delivery. No one can tell how much we should allow for cartage, or whether we should take American freight rates or express rates as our standard of comparison. An extremely rough estimate, not making allowance for any of the disadvantages to which English railroads are subject, would indicate that their charges per ton-mile on all traffic average are from fifty to seventy-five per cent. higher than ours." 4/ 5/

In 1897 Mr. J. S. Jeans, a British statistician, comparing 1883 average receipts per ton-mile and average haul in the principal

- 1/ J. Grierson, "Railway Rates: English and Foreign", London, 1886, Appendix I, p. 1.
- 2/ Arthur T. Hadley, Commissioner of Labor Statistics of the State of Connecticut and Instructor in Political Science in Yale College, "Railroad Transportation: Its History and Its Laws", New York, 1885, pp. 201-202.
- 3/ Ibid., p. 216.
- 4/ Ibid., p. 158.
- 5/ For the year 1883 the revenue per ton-mile for the American railways was 1.236 cents. - Henry V. Poor, "Manual of the Railroads of the United States for 1884", New York, 1884, p. VI.

countries of continental Europe remarked that the shortest average haul on the Continent coincides with the highest average ton-mile rates. 1/ He also indicated that factors such as density of traffic, the proportion of minerals carried relatively to the total tonnage, proportion of one-way traffic, and weight of the load hauled influence the rates at which traffic is carried. 2/

During the same year (1887) Mr. Edward B. Dorsey, an American civil engineer, made a comparative study of English and American railways for the years 1883-1884. 3/ He concluded that for similar accommodation the freight charges are much less on American than on English railways. 4/ In his discussion of railway costs he attributed this difference in freight rates to the greater cost of construction of English railways (easier grades and curves) and to their higher cost of operation (greater speed, small tonnage of the freight trains) in comparison with the American railways. 5/

It should be observed, however, that explanations similar to this one made by Mr. Dorsey were not considered by railway economic analysts as the major factors influencing railway freight rates. For instance, Dr. Henry C. Adams, in one of his studies comparing ton-mile revenues for different territorial railway groups in this country, stated that the "physical characteristics of railways" as one of the generally accepted factors in determining railway charges "has been greatly over-estimated, and it has been one of the results of recent railway statistics in this country to show that engineers have committed the error of laying too great stress upon curves and grade." 6/

Mr. W. M. Acworth, a British railway expert, has also remarked: "It is common to speak as though the high range of charges on the English railways were due directly to their enormous capital

- 1/ J. S. Jeans, "Railway Problems: An Inquiry into the Economic Conditions of Railway Working in Different Countries," London, 1887, pp. 277-278.
- 2/ Ibid., pp. 272-279.
- 3/ Edward Bates Dorsey, "English and American Railroads Compared", New York, 1887.
- 4/ Ibid., p. 77.
- 5/ Ibid., pp. 76-78.
- 6/ Henry C. Adams, Ph. D., Statistician, Interstate Commerce Commission, "Some Recent Results in Railway Statistics in the United States", art. in Quarterly Publications of the American Statistical Association, December 1893, pp. 504-505.

expenditure. This, however, ... cannot be admitted to be correct." ^{1/} He pointed out that no manager in England in fixing a rate ever takes into consideration what his line has cost, but confines himself solely to an individual rate looked at per se - how small he obtain the largest amount of net revenue. ^{2/}

Later International Comparisons of Ton-Mile Revenues

During the nineties and the first decade of this century the comparative data on revenue per unit of freight traffic service (ton-mile, metric ton-kilometer, pood-verst) were widely discussed in various countries, and erroneous conclusions were quite often drawn. Referring to the extent of the ton-mile revenue discussions in this country, it is interesting to quote a statement on this subject made by Professor William Z. Ripley. He said: "For a generation, and particularly in connection with the Roosevelt legislation in 1906, volumes of written and oral evidence upon moot questions were based upon such figures. Specious and misleading reasoning upon a public question was perhaps never more common in the course of our history." ^{3/ 4/}

In November 1905, Mr. Walter C. Noyes, President of New London Northern Railroad Company, published his book on "American Railroad Rates" in which he presented comparisons of ton-mile revenues between the railway systems of the United States and major European countries (except Russia) in a more systematic and comprehensive fashion than they had previously been made by other railway experts.

Comparing the following data for 1902:

- ^{1/} W. M. Acworth, "The Railways and the Traders - A Sketch of the Railway Rates Question in Theory and Practice", London, 1891, pp. 250-251, 7.
- ^{2/} Ibid., p. 251.
- ^{3/} William Z. Ripley, Professor of Economics at Harvard University, "Railroads, Rates, and Regulation", New York, 1913, pp. 411-412.
- ^{4/} Even certain recent publications dealing with international ton-mile revenue statistics are not free from criticism as to method and interpretation. See, for instance: "American Freight Rates - A Comparison Here and Abroad" - editorial article in The Commercial & Financial Chronicle, New York, October 13, 1934, pp. 2258-2259; "U. S. Carriers' Average Freight Receipts per Ton-Mile Second Lowest in World" - article in The Wall Street Journal, New York, December 20, 1937, pp. 1, 9.

Revenue per ton-mile (Cents)

United States	.76
Germany	1.22
Austria	1.26
France	1.37
Italy	1.55 (?)
England	2 + (an estimated figure)

Mr. Noyes remarked that the average charges per ton-mile do not show correctly the real differences between American and European rates and that the differences in average rates are not real unless due consideration is given to dissimilarity in traffic conditions affecting these charges. ^{1/}

The differences in traffic conditions described by Mr. Noyes in his book ^{2/} may be summarized as follows:

Item	United States	Major European countries except Russia
Length of the average haul (in 1902)	131 miles ^{1/}	About half of an American figure.
Size of the normal shipment	Carload	100-200 pounds
Nature of the commodities .	Chiefly raw products	Mostly manufactured goods and high grade traffic
Methods of doing business .	All freight received and delivered at railroad stations	High class freight collected and delivered to addressees
Expenses of operation:		
Wages	High, but labor of superior efficiency	Less than half those paid to American railroad labor
Fuel	Cheap	Expensive

- ^{1/} As reported by all individual railways; 239 miles for the American railways as a system. - Interstate Commerce Commission, "Statistics of Railways in the United States, 1926", p. CII.

- ^{1/} Walter Chadwick Noyes, "American Railroad Rates" (published in November 1905), Boston, 1906, p. 183.
- ^{2/} Ibid., pp. 182-185.

In conclusion, Mr. Noyes stated: "It is apparent ... that the real difference in charges for similar services is very much less than that indicated by the comparison of average rates." ^{1/} "Therefore," he said, "we can only draw the most general conclusions from the comparison of charges ...: (1) American rates upon long-distance traffic and upon heavy shipments are very much less than the charges for similar services upon the European railroads; (2) charges upon short-distance traffic and small shipments are not materially different in America and Europe ..." ^{2/} Mr. Noyes also indicated that in comparisons of rates due consideration must be given to the fact that the American railroads do not receive financial assistance from the State treasury, that they operate on competitive basis, and that in order to obtain business they have been obliged to reduce the cost of transportation. ^{3/}

The question of relative adjustment of railway freight rates in given countries was also raised by Dr. Henry C. Adams in his study of Prussian and American railway freight rates (December 1905). Dr. Adams begins his report with the comparison of data on railway freight revenue per ton-mile for Prussia (Prussian-Hessian railways) and the United States for the year 1903: ^{4/}

Item	Prussia ^{1/}	United States ^{2/}	
		As a system, duplications excluded	As reported by individual railways, duplications not excluded
Tons, millions	232	715	1,304
Ton-miles, billions	16.7	173.2	173.2
Average haul, miles	71.9	242.35	132.80
Total freight revenue, million dollars	306	1,338	1,338
Revenue per ton, dollars88	1.85	1.05
Revenue per ton-mile, cents .	1.23	.755	.753

^{1/} Includes fast freight and express freight traffic, but excludes cattle, military, post and company freight.

^{2/} Revenue freight traffic, excluding express freight.

^{1/} Ibid., p. 185.

^{2/} Ibid., p. 186.

^{3/} Ibid., pp. 185-186.

^{4/} Henry C. Adams, Statistician to the Interstate Commerce Commission. "Prussian Railway Tariffs", a report prepared for the (U.S. Senate) Committee on Interstate Commerce, 59th Congress, 1st Session, Senate Document No. 244, Part II, Appendix IX, Washington, 1906, p. 12.

The above figures showed the ton-mile revenue to be lower for the American railways than for the Prussian-Hessian railways and, as remarked by Dr. Adams, "no very significant conclusion can be drawn from such a comparison since the average rate per ton-mile is affected quite as much by the distribution of tonnage between high and low class freight as by the rate actually charged." ^{1/} He pointed out that the services rendered by waterways is also an essential factor in determining the question of whether transportation rates in Prussia are higher or lower than rates in the United States. It is evident, he stated, that the relative significance placed upon these two means of transportation in the two countries under consideration must exercise a decided influence upon the average or basal railway rates. ^{2/}

The major portion of Dr. Adams' study consists of a comparison of the railway freight rates expressed in cents per ton-mile for selected commodities (bituminous coal, raw wool, woolen yarns, cotton yarns, coffee, and manufactured tobacco) actually moved between specified points in Prussia (Prussian-Hessian railways) and in the United States (for railways lying in the States of New York, Pennsylvania, New Jersey, Delaware, and Maryland).

Comparing these rates (expressed in cents per ton-mile) Dr. Adams concluded that the Prussian rates for a distance not exceeding the average haul on the Prussian railways (71.9 miles) are lower than the American rates, but for long hauls the American rates are lower than the Prussian rates. ^{3/} He also pointed out that whether or not Prussian railways place too great emphasis upon the short haul traffic and the American railways upon the long haul traffic is a question to be decided individually in view of conditions prevailing in each country. ^{4/}

A study made by M. Clement Colson (a former Director of Railways in Ministry of Public Works, France) compares revenues per metric ton-kilometer ^{5/} on the French and Prussian (State) railways for the year 1906 subdivided between coal and other slow freight: ^{6/}

^{1/} Ibid., p. 12.

^{2/} Ibid., p. 13.

^{3/} Ibid., p. 24.

^{4/} Ibid.

^{5/} A metric ton-kilometer is approximately .685 ton-mile.

^{6/} C. Colson, "Transports et Tarifs", Paris, 1908, pp. 761-762.

Slow Freight Traffic

Railways	Commodity	Total freight revenue (Million francs)	Metric ton-kilometers (Millions)	Revenue per ton-kilometer (Centimes)
French railways	Coal	140	4,378	3.20
	Other commodities	697	14,103	4.95
	All commodities	837	18,481	4.53
Prussian State railways	Coal	337	13,175	3.20
	Other commodities	773	19,184	5.04
	All commodities	1,110	32,359	4.29

M. Colson indicated that the Prussian railways with an equal rate per ton-kilometer for coal compared with the French railways and with a higher rate for other slow moving commodities, still have a lower average rate per ton-kilometer for all commodities. This, he explained, is because coal constitutes 41 percent of the Prussian railway freight traffic and only 24 percent of the French traffic. ^{1/}

In 1910 Professor K. J. Zagorsky, a Russian economist, made a comparative study of railway freight traffic rates (for certain commodities) in Russia, France, Germany, and Austria-Hungary. Professor Zagorsky in his study explicitly rejected the idea of using the average revenue per unit of transportation service ("pood-verst" in Russia at that time) as a satisfactory method for comparing the tariff rates in various countries, ^{2/} this for reasons already discussed above relating to character of service and conditions affecting traffic and rates.

The use of ton-mile revenue unit for international comparisons of railway freight rates was also criticized by the Bureau of Railway Economics in its 1915 comparative study of railway freight rates in various countries. Such comparisons, so the Bureau stated, give no indication of the specific rates which are the basis of the average receipts per ton-mile nor of the varying proportions in which different commodities enter into the total traffic, nor the different distances

^{1/} Ibid., p. 762.

^{2/} K. J. Zagorsky, "Survey of Railway Tariffs of France, Germany and Austria-Hungary in Comparison with Russian Railway Tariffs", St. Petersburg, 1910, pp. 9-21 (in Russian).

they are carried. Nor does a statement of average receipts cast light upon the conditions under which the traffic is handled. ^{1/} These conclusions led the Bureau of Railway Economics to base its comparison of railway freight rates in the United States and other countries upon selected typical rates for certain basic commodities (coal, iron ore, lumber, grain, stone, fertilizer, logs, iron and steel products, brick, and textiles). The rates used were those under which a considerable volume of traffic actually moved by ordinary freight over the same or closely corresponding distances, and under substantially similar circumstances. The American rates, effective in the latter part of the calendar year 1911, were furnished by 18 principal American railways ^{2/} at the request of the Bureau. The rates of other countries (United Kingdom, Germany, Austria, Hungary, Russia, Holland, Sweden, Norway, Spain, Italy, Belgium, South Australia, and South Africa) effective as a rule during 1910, were obtained from the series of published and unpublished documents ^{3/} prepared for the National Waterway Commission.

The Bureau, indicating that no attempt had been made to analyze the distribution of traffic by commodities or distances, stated that commodities, for which rates are shown in its report, represent from one-third to two-thirds of the total freight movement by rail, and that the results, therefore, may be regarded as fairly representative of freight levels in countries under consideration. ^{4/} In order to facilitate comparison, the Bureau converted all (minimum weight) rates into cents per ton-mile and presented all data in a series of tables arranged by commodities so that each table represents a comparison of railway freight rates for a particular commodity in a foreign country with corresponding rates in the United States for approximately equal distances. ^{5/}

^{1/} Bureau of Railway Economics, "Comparison of Railway Freight Rates in the United States, the Principal Countries of Europe, South Australia, and South Africa", Washington, 1915, p. 4.

^{2/} Atchison, Topeka & Santa Fe; Baltimore & Ohio; Bessemer & Lake Erie; Boston & Maine; Chesapeake & Ohio; Chicago, Burlington & Quincy; Illinois Central; Missouri Pacific; New York Central & Hudson River; New York, New Haven & Hartford; Norfolk & Western; Northern Pacific; Pennsylvania Railroad; Pennsylvania Lines West; Southern Pacific; Southern Railway; Union Pacific; and Wabash.

^{3/} Replies to a questionnaire submitted jointly by the National Waterway Commission and the Department of Commerce and Labor through the Department of State in August 1909.

^{4/} Ibid.

^{5/} The following data are given in each table: origin and destination of shipment and distance, minimum weight to which the rate applies, total transportation rate per ton (2,000 lbs.), rate per ton-mile, and unweighted average rate per ton-mile for a number of rates compared.

From its comparison of these (unweighted) average rates per ton-mile in foreign countries and the United States, the conclusion was reached that: "It is entirely within the truth to say that the freight level of the United States is lower than that in the countries of Europe." ^{1/}

When the comparison is made, however, between specific rates per ton-mile for particular commodities, it may be noted that the American rates are often higher than the European rates. This may be illustrated by the following analysis of the actual railway freight rates per ton-mile for certain basic commodities (for instance, coal, iron ore, lumber, stone, and grain) in European countries as compared with the corresponding rates in the United States: ^{2/}

^{1/} Ibid., p. 5.

^{2/} Ibid., pp. 14-95.

Country	Range of distances for which railway freight rates ap- plied in European countries	Total number of rates in Euro- pean countries compared with corresponding rates in the United States	European rates lower than corresponding rates in U. S.	
			Number	Percent
(Miles)				
<u>Coal</u>				
United Kingdom 1/	14 - 212	10	4	40.0
France	22 - 513	39	7	17.9
Germany	21 - 821	53	8	15.1
Russia	117 - 1,423	12	4	33.3
Holland	70 - 212	49	32	65.3
Sweden	9 - 379	10	3	30.0
<u>Iron Ore</u>				
United Kingdom 2/	15 - 188	16	3	18.8
France	37 - 513	42	7	16.7
Germany	27 - 585	20	5	25.0
Belgium	6 - 158	10	5	50.0
<u>Lumber</u>				
France	37 - 513	34	19	55.9
Russia	52 - 2,283	16	11	68.8
Holland	63 - 212	10	5	50.0
Sweden	9 - 438	10	10	100.0
Belgium	3 - 194	14	14	100.0
<u>Stone</u>				
France	37 - 513	30	12	40.0
Sweden	16 - 478	10	6	60.0
Belgium	6 - 130	11	8	72.7
<u>Grain</u>				
France	35 - 513	31	18	58.1
Austria	80 - 737	16	4	25.0
Russia	89 - 2,135	10	4	40.0
Sweden	11 - 1,044	10	5	50.0

^{1/} Cars furnished by coal mine proprietors. The rates include return of empty cars to the coal mine.

^{2/} Rates include collection at sender's and delivery at consignee's sidings.

Qualifications of its study were pointed out by the Bureau. "It is of course impossible in any tabular comparison of rates to present all differences in conditions in the countries compared." ^{1/} It was indicated that no attempt had been made "to discuss the relations between the railways and the respective governments with a view of tracing the effect of political motive in adjusting rates, or to bring out whether the railways are sustained entirely by their revenues or in part by taxation." ^{2/}

This survey of various studies on international comparisons of railway freight revenues per ton-mile indicates clearly that such comparisons are not significant unless due consideration is given to the kind of service rendered by railways and to the dissimilarity in economic and other conditions affecting railway freight traffic and rates actually charged. The latter factor also has a direct bearing upon the validity of any comparisons of actual railway freight rates in various countries. ^{3/}

In the final analysis, the dissimilarity in economic and other conditions affecting railway freight traffic and rates (actually charged) accounts, to a large extent, for differences in ton-mile revenues of railway systems in countries compared. Also the relative adjustment of those freight rates to the economic and other conditions in countries is no doubt of greater significance and importance than the actual rates. Or, as Professor Zagorsky has said, each country must have her own tariff rates according to her economic, geographic and other conditions, and the absolute amounts of tariff rates are not of importance in comparison with a degree of their adaptability to the changing conditions and needs of production and consumption. ^{4/}

^{1/} Ibid., p. 6.

^{2/} Ibid., p. 5.

^{3/} It also should be noticed that the wide fluctuation of foreign exchange in the post-war period is a factor which must not be overlooked if any attempt is made at the present to express ton-mile revenues (or specific freight rates) in various countries on the monetary basis of a singular country.

^{4/} Zagorsky, supra, p. 269.

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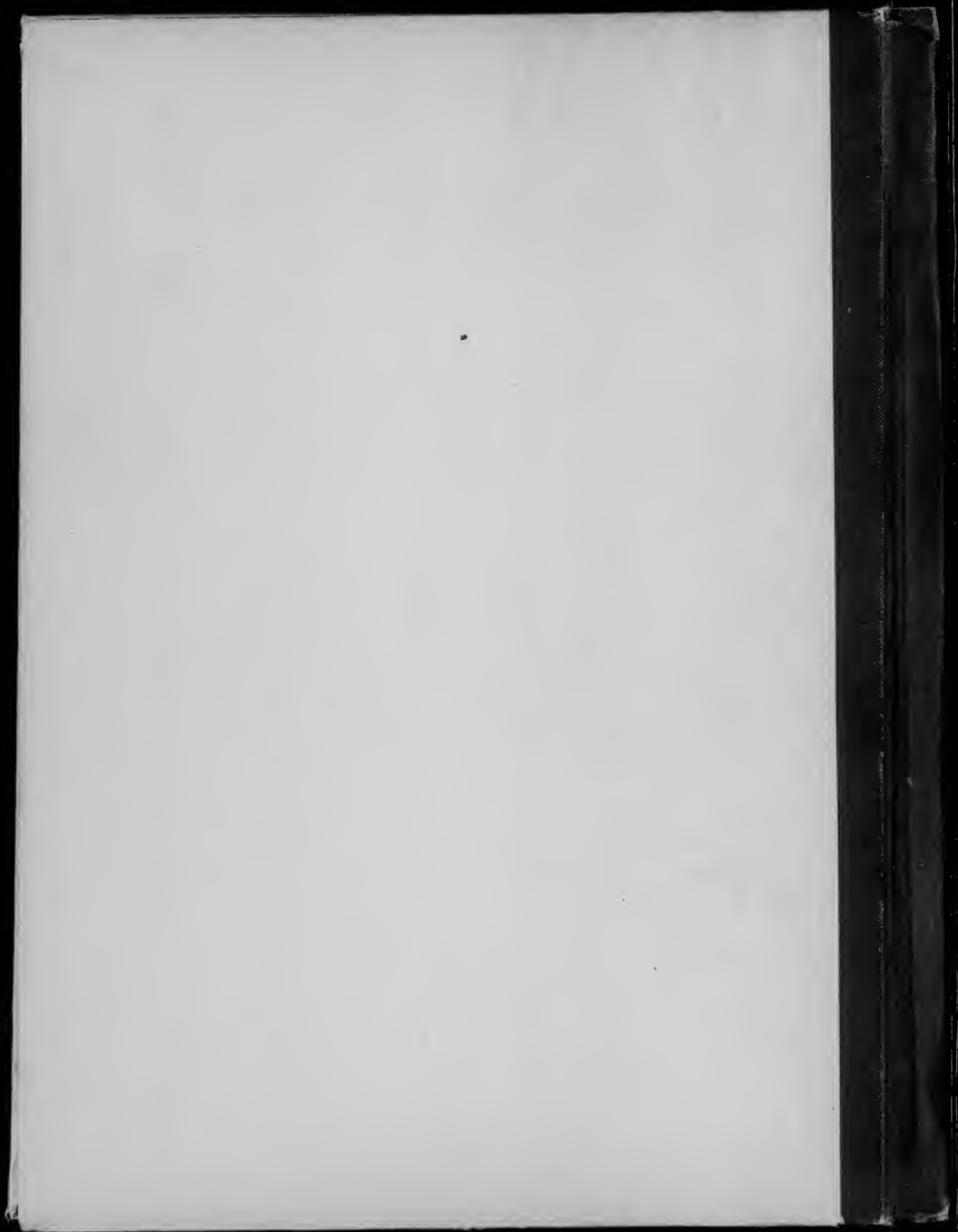
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